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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,702	08/20/2003	Kai Roland Kriedte	Kriedte 4-1-2	6700

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EXAMINER	
CORRIELUS, JEAN B	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 11/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/644,702	KRIEDTE ET AL.	
	Examiner	Art Unit	
	Jean B. Corrielus	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12,13,15-22,24 and 26* is/are rejected.

7)☒ Claim(s) *11,14,23 and 25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/20/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Please update the status of the related application mention throughout the specification.

Claim Objections

2. Claims 1-14 and 16-26 are objected to because of the following informalities: claim 1 please expand "CIR".

As per claim 2, please expand "OFDM"

Claims 3-14, "invention" should be replaced by "method", respectively.

Claims 16-25, "invention" should be replaced by "receiver", respectively.

Claim 10 recites "each different receiver antenna. However, there is no previous limitation to a plurality of receiver antennas. The same comment applies to claim 11. As per claim 11, the claim recites "all of the antennas of the receiver". However, there is no previous limitation to "the antennas of the receiver". The same comment applies to claim 13.

Claim 15 recites that **the receiver includes a plurality of antennas** and claim 21 recites that the plurality of channels corresponds to **a single antenna of the receiver**. Does this mean the other antennas of the receiver are not used? Please clarify.

Claim 26, line 3, recites "a method comprising" however, it is noted that the claim is not directed to a method. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3, 4 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. As per claim 3, the limitation "the CIR" lacks of proper antecedent basis. The same comment applies to claim 16. Claim 4 is likewise rejected because of its dependency to claim 3.

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claim 26 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claim recites a machine readable medium having encoded thereon program code wherein when the program code is executed by a machine, the machine implements in a receiver of MIMO system ... processing the received signals based on the symbol timing. However it is noted that the specification only recites briefly that the invention can be embodied in the form of program code without adequate and enabling disclosure.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 3, 5-7, 9-10, 12, 13, 15, 17-19, 21, 22, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sehier US Patent No. 5,285,482 in view of Alamouti et al US patent publication No. US2004/0234003A1.

As per claim 1, Sehier et al discloses a timing recovery method and apparatus comprising receiving a plurality of signals (1); for each channels, estimating a CIR value using element 23 characterizing impulse response of the channel see col. 5, lines 19-20; summing the plurality of CIR values for the plurality of channels note col. 5, line 45 where the equation includes sum of CIRs (Wi) and integrating the summed CIR values over a specified window again col. 5, col. 45, Sehier teaches summation or integration of the summed CIR from a window 0 to q-1; a symbol timing is determined from the integrated summed see col. 5, lines 45-55 and processing the received signals based on the symbol timing using circuit 6. However, Sehier does not teach that the signals are received from a plurality of transmitter antenna. Alamouti et al discloses a receiver for receiving a plurality of signals from a plurality of transmitter antenna see fig. 4. Given that fact, it would have been obvious to one skill in the art to incorporate such a teaching in Sehier et al so as to be able to process signals from systems that use STTD encoding technique that generally employs at least two transmitting antennas.

As per claim 3, each value corresponds to power of the CIR see col. 5, line 5, that shows the Wi generated from a power of the parameters inside the absolute value symbol that corresponds to the CIR.

As per claim 5, as applied to claim 1 above, Sehier et al and Alamouti disclose every feature of the claimed invention do not explicitly the specified window is equal to the length of a guard interval of symbols in the received signals. It would have been obvious to one skill in the art to set the specified window equal to the length of a guard interval of symbols in the received signals in order to ensure that characteristics of the transmission channel are accurately determined.

As per claim 6, it would have been obvious to one skill in the art to set the specified window at a duration substantially equal to a maximum tolerable delay spread for the received signals and the motivation to do so would have been the same as provided above with respect to claim 5.

As per claim 7, it would have been obvious to one skill in the art to determined symbol timing based on a maximum of the integrated summed CIR values in order to ensure that only positive values are generated so as to simplify circuit layout.

As per claim 9, Sehier does not explicitly teach that the plurality of channels corresponds to a single antenna of the receiver. Alamouti discloses that the plurality of channels corresponds to a single antenna of the receiver see fig. 3. It would have been obvious to one skill in the art to configure the receiver with a single receiving antenna and the motivation to do so would have been the same as provided above with respect to claim 1.

As per claim 10, it would have been obvious to one skill in the art to determine a different timing for each receiver antenna in order to reconstruct respective signal base on their respective symbol timing.

As per claim 12, Sehier dos not explicitly teach the plurality of channels corresponds to all of the antennas of the receiver. Alamouti teaches the plurality of channels corresponds to all of the antennas of the receiver see fig. 4. Given that, it would have been obvious to one skill in the art to configure the receiver with a single receiving antenna and the motivation to do so would have been the same as provided above with respect to claim 1.

As per claim 13, a joint timing is determined at the output of circuit 29 for all receiver antennas see input of circuit 6.

As per claim 15, see claim 1 above and in addition, Sehier teaches inherently a plurality of receiver antenna to receive each signal (1); a receiver branch for each different receiver antenna, each receiver branch having a transform adapted to transform a corresponding receiving signal into a plurality of transformed components see for instance fig. 1, element 8; a symbol decoder see for instance (12 and 14) for receiving transform components, i.e., output of the adder 10, from each transform (note the summed output from adder 10 is a resultant signal from each transform 8); and processing within each receiver branch see fig. 1 is based on symbol timing deter mined for each receiver branch see the symbol timing provided to circuit 6 in each branch of fig. 1. However, Sehier does not teach that the signals are received from a plurality of transmitter antenna in a MIMO system. Alamouti et al discloses a receiver for

receiving a plurality of signals from a plurality of transmitter antenna in a MIMO system see fig. 4. Given that fact, it would have been obvious to one skill in the art to incorporate such a teaching in Sehier et al so as to be able to process signals from systems that use STTD encoding technique that generally employs at least two transmitting antennas.

As per claim 17, see claim 5.

As per claim 18, see claim 6.

As per claim 19, see claim 7.

As per claim 21, see claim 9.

As per claim 22, see claim 10.

As per claim 24, see claim 13.

As per claim 26, see claim 1.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sehier in view of Alamouti et al US patent publication No. US2004/0234003A1 and further in view of Li et al US PUB. No. US 2006/0209765 A1.

As per claim 2, as applied to claim 1 above, Sehier et al and Alamouti disclose every feature of the claimed invention do not explicitly teach the MIMO system is a MIMO OFDM system. Li et al teaches MIMO system as a MIMO OFDM system, see abstract. Given that fact, it would have been obvious to one skill in the art to incorporate such a teaching in Sehier et al and Alamouti so as to provide compatibility to system that uses OFDM modulation scheme.

11. Claims 8 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sehier US Patent No. 5,285,482 in view of Alamouti et al US patent publication No. US2004/0234003A1 and further in view of Schmidl et al IEEE transaction on communications, Vol. 45, No. 12, December 1997, page 1613-1621.

As per claim 8, as applied to claim 1 above, Sehier et al and Alamouti disclose every feature of the claimed invention do not explicitly teach that the processing of the received signals includes generating a DFT for each received signal and wherein the DFT is based on the determined symbol timing. Schmidl et al teaches fig. 2, a processing of a received signal includes generating a DFT based on the determined symbol timing. Given that fact, it would have been obvious to one skill in the art to incorporate such a teaching in Sehier and Alamouti so as to enhance signal acquisition.

As per claim 20, see claim 8.

12. Claims 4 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sehier in view of Alamouti et al US patent publication No. US2004/0234003A1 in view of KOBYLINSKI et al US PUB. No. US 2004/0184568 A1.

As per claim 4, as applied to claim 1 above, Sehier et al and Alamouti discloses every feature of the claimed invention do not explicitly teach each CIR value is based on a correlation between a corresponding received signal and a known training sequence. KOBYLINSKI et al teaches a CIR value is based on a correlation between a corresponding received signal and a known training sequence see paragraph 0056. Given that fact, it would have been obvious to one skill in the art to incorporate such a

teaching in Sehier and Alamouti so as to provide accurate estimate of the transmission signal required to reconstruct the original signal.

As per claim 16, see claim 4, above and in addition, each value corresponds to power of the CIR see col. 5, line 5, that shows the Wi generated from a power of the parameters inside the absolute value symbol that corresponds to the CIR.

Allowable Subject Matter

13. Claims 11, 14, 23, and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean B. Corrielus whose telephone number is 571-272-3020. The examiner can normally be reached on M-TH from 9:00-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jean B Corrielus
Primary Examiner
Art Unit 2611
11-21-06